

# DRAFT

---

**TECHNICAL MEMORANDUM 7  
LOUREIRO ENGINEERING ASSOCIATES  
ANALYTICAL LABORATORY**

RCRA RECORDS CENTER  
FACILITY Pratt & Whitney - Main St  
I.D. NO. CTD990672081  
FILE LOC. R-5  
OTHER RDMS #2245

**SUMMARY  
SITE INVESTIGATION AND REMEDIATION REPORT  
AIRPORT/KLONDIKE AREA  
AT  
PRATT & WHITNEY  
EAST HARTFORD, CONNECTICUT  
EPA ID No. CTD990672081**

**Prepared for:**

**PRATT & WHITNEY  
400 Main Street  
East Hartford, Connecticut 06108**

**Prepared by:**

**LOUREIRO ENGINEERING ASSOCIATES  
100 Northwest Drive  
Plainville, Connecticut 06062**

**LEA Comm. No. 68V8124**

---

## Table of Contents

	Page
<b>1. INTRODUCTION</b>	<b>1-1</b>
1.1 Purpose and Objective	1-1
1.2 Background	1-1
1.3 Scope	1-2
<b>2. METHODOLOGY</b>	<b>2-1</b>
2.1 General Procedures	2-1
2.1.1 Soil Sample Collection	2-2
2.1.2 Groundwater Sample Collection	2-2
2.1.3 Sample Handling and Transport	2-3
2.1.4 Sample Storage	2-3
2.2 Sample Analyses	2-4
2.3 Quality Assurance/Quality Control Procedures	2-4
2.3.1 Field Quality Assurance/Quality Control Procedures	2-5
2.3.2 Laboratory Analytical Quality Assurance/Quality Control Procedures	2-5
2.3.3 Method Detection Limits	2-6
2.3.4 Sensitivity	2-6
2.3.5 Calibration	2-6
2.3.6 Surrogate Standards	2-7
2.4 Decontamination of Materials and Equipment	2-7
2.5 Sample Custody	2-8
2.6 Reporting	2-9
2.7 Waste Management	2-10
<b>3. RESULTS</b>	<b>3-1</b>

## TABLES

Table 1	LEA Analytical Laboratory Method Detection Limit Study Results
Table 2	LEA Analytical Laboratory Data Qualifiers

## Acronyms

ACC	Accutest Laboratories
AEL	Averill Environmental Laboratory, Inc.
BZ	Benzene
CFR	Code of Federal Regulations
DEP	State of Connecticut Department of Environmental Protection
DPH	State of Connecticut Department of Public Health
EBZ	Ethylbenzene
EPA	Environmental Protection Agency
F&O	Fuss & O'Neill, Inc.
GC	Gas Chromatograph
H&A	Haley & Aldrich, Inc.
LAN	Lancaster Laboratories
LEA	Loureiro Engineering Associates, P.C.
M&E	Metcalf & Eddy, Inc.
MDL	Method Detection Limit
P&W	Pratt & Whitney
PCE	Tetrachloroethylene
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
QNT	Quanterra, Inc.
SOP	Standard Operating Procedure
TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
TL	Toluene
TM	Technical Memorandum
USTM	Unit-Specific Technical Memorandum
VOA	Volatile Organic Analysis
XYL	Total Xylenes

## 1. INTRODUCTION

### 1.1 Purpose and Objective

This Technical Memorandum (TM) presents the methodology of the operation of the Loureiro Engineering Associates, P. C. (LEA) Analytical Laboratory for soil and groundwater samples collected from the Airport/Klondike Area (Site) of the Pratt & Whitney (P&W) facility located at 400 Main Street (Main Street facility) in the Town of East Hartford, Connecticut.

LEA operates an analytical laboratory to provide screening analytical data that was used to assist in site investigation activities of the Airport/Klondike Area. The laboratory's function was to perform expedited analyses of samples to support the field sampling activities and to aid in the selection of samples that were submitted to fixed off-site laboratories for more comprehensive analysis. The LEA Analytical Laboratory is certified by the Connecticut Department of Public Health (Certification Number PH-0415) and by the Environmental Protection Agency (EPA) (EPA Certification Number CT00911) for analysis of target volatile organic compounds (VOCs) including benzene (BZ), ethylbenzene (EBZ), tetrachloroethylene (PCE), toluene (TL), 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), and total xylenes (XYL).

### 1.2 Background

The Airport/Klondike Area is located on the eastern portion of the P&W Main Street facility on the east side of the main plant, north of Brewer Street and south of Silver Lane. The Airport/Klondike Area consists of four study areas that include the North and South Airport Areas and the North and South Klondike Areas. During the Site investigation and remediation activities performed by LEA, soil samples collected as part of the contaminant delineation investigations were routinely submitted to the LEA Analytical Laboratory for screening VOCs analyses. Similarly, soil samples collected as part of the Containment Building operation were routinely submitted to the LEA Analytical Laboratory for VOCs analyses to evaluate the operation of the building and the effectiveness of the VOC removal process.

For the investigation activities, the results of these soil analyses were used, in conjunction with other relevant data, including visual, olfactory, or instrument evidence (i.e., photoionization detector, flame ionization detector), and with consideration of the potential release mechanism, to select soil samples for submission to fixed off-site laboratories for additional analytical testing. Soil samples were also submitted to the following laboratories for analysis: Accutest Laboratories (ACC), Averill Environmental Laboratory, Inc. (AEL), Lancaster Laboratories

(LAN), and Quanterra, Inc. (QNT). The LEA analytical results were also used to direct soil boring activities associated with contaminant delineation programs.

In addition, a limited number of groundwater samples (i.e., twelve samples) collected during August through October 1996 were analyzed by the LEA Analytical Laboratory. Of the twelve groundwater samples analyzed by the LEA Analytical Laboratory, nine of the twelve were subsequently submitted to a fixed off-site laboratories for additional analytical testing. In the remaining samples, groundwater samples were submitted to the LEA Analytical Laboratory for screening analysis and the specific samples were not submitted to fixed off-site laboratories for additional analytical testing. Due to the limited number of groundwater samples collected per sampling location in comparison to the relative large number of soil samples collected per sampling location, the vast majority of groundwater samples were submitted to the fixed off-site laboratories for analysis.

### 1.3 Scope

This TM covers the techniques and methodologies used for the analysis and reporting of data generated by the LEA Analytical Laboratory. The methods and techniques discussed are those used by the LEA Analytical Laboratory during the period from approximately 1995 through 1998. However, this TM does not cover the results of specific chemical analyses of soil samples collected during the investigation and remediation activities as these data are discussed in the appropriate Unit-Specific Technical Memorandum (USTM).

## 2. METHODOLOGY

This section presents the methods and techniques used to collect, transport, and analyze the soil and groundwater samples submitted to the LEA Analytical Laboratory. This section includes relevant information that has also been presented in *TM 1 Monitoring Well Installation and Development and Soil Sampling* and *TM 5 Soil Boring Installation and Soil Sampling*.

### 2.1 General Procedures

This section describes the general procedures and methodologies used to collect and analyze soil and groundwater samples submitted to the LEA Analytical Laboratory. Soil samples were collected during the installation of monitoring wells and soil borings throughout the Airport/Klondike Area. The soil borings and monitoring wells installed during the most recent investigation activities were installed in general accordance with the procedures described in LEA Standard Operating Procedures (SOP) *Standard Operating Procedure for Geoprobe® Probing and Sampling*, the LEA SOP *Standard Operating Procedure for Geologic Logging of Unconsolidated Sedimentary Materials*, the LEA SOP *Standard Operating Procedure for Hollow Stem Auger Borings*, the LEA SOP *Standard Operating Procedure for Monitoring Well Installation*, and the LEA SOP *Standard Operating Procedure for Soil Sampling*. More specific details on the monitoring well installation and the soil boring installation are included in *TM 1 Monitoring Well Installation and Development and Soil Sampling* and *TM 5 Soil Boring Installation and Soil Sampling*, respectively.

Groundwater samples were collected by using Geoprobe® screenpoint groundwater sampling techniques during the installation of soil borings throughout the Airport/Klondike Area. The groundwater samples were collected in general accordance with the LEA SOP *Liquid Sample Collection and Field Analysis*. More specific details on the groundwater sampling are included in *TM 3 Groundwater Sampling and Quality*.

Samples were collected for analysis at the LEA Analytical Laboratory for target VOCs, including BZ, EBZ, PCE, TL, TCA, TCE, and XYL. The LEA Analytical Laboratory is capable of operating as a mobile laboratory at the site being investigated. However, due to the proximity of the Site in East Hartford and the LEA office in Plainville, the LEA Analytical Laboratory was operated as a fixed laboratory and samples were delivered to the laboratory daily.

## 2.1.1 Soil Sample Collection

Soil samples were collected by using standard hollow-stem auger with split-spoon samplers, the LEA Geoprobe® direct-push techniques with Geoprobe® Macro-Core® soil sampling equipment, or by hand-auger/trowel. Soil sampling and collection methodologies are discussed in more detail in *TM 1 Monitoring Well Installation and Development and Soil Sampling* and *TM 5 Soil Boring Installation and Soil Sampling*.

Immediately after collection, the soil sampler was opened and an aliquot of the soil was collected, via a stainless-steel spatula, into a 40-milliliter vial a Teflon® septum. Prior to filling, an analytical balance was tared against the weight of the vial. Approximately 5 grams of soil was placed into the vial and the mass of soil was recorded to the nearest 0.1 gram. Between 4.0 and 6.0 grams of soil was considered an acceptable range for the mass of soil collected. Calibration of the analytical balance used in the field for sample collection is part of the LEA Analytical Laboratory protocols and was performed daily in accordance with the requirements of the laboratory certification.

After the mass of soil placed into the vial was determined, the vials were filled with pre-acidified, laboratory-supplied water to a volume of 30-milliliters. The volume of sampling water added was regulated by placing the vials with the soil into a specifically-sized plastic or wooden block and filling the vial until the liquid level in the vial was level with the top of the block. After the proper volume of sampling water was placed into the vial, the vials were immediately capped to prevent the loss of volatiles. All vials were placed septum-down were placed into iced sample coolers for the remainder of the sampling day.

## 2.1.2 Groundwater Sample Collection

Groundwater samples were collected in general accordance with the procedures presented in LEA SOP *Geoprobe® Screen Point Groundwater Sampling*. The groundwater sampling and collection methodologies are discussed in more detail in *TM 3 Groundwater Sampling and Quality*.

After the screenpoint sampler was driven to the desired depth, the drive sheath was retracted and the screen was exposed. Groundwater samples were collected using disposable polyethylene tubing and a low-flow peristaltic pumps directly into vials equipped with a Teflon® septum. During sample collection, these vials were placed into the specifically-sized plastic or wooden block and the vials were filled until the liquid level in the vial was level with the top of the block.

After the proper volume of groundwater was placed into the vial, the vials were immediately



capped to prevent the loss of volatiles. All vials were placed septum-down were placed into iced sample coolers for the remainder of the sampling day.

### **2.1.3 Sample Handling and Transport**

Immediately after collection, filled vials were labeled and transferred to iced sample coolers. The vials were placed, septum down, into foam inserts in the coolers to prevent breakage and minimize agitation of the vials during subsequent handling and transportation. Samples destined for the LEA Analytical Laboratory were kept in a separate cooler from samples destined for shipment to an off-site fixed laboratory. A laboratory-supplied trip blank, as discussed in Section 2.3 was also included in each sample cooler.

Soil samples were collected for the purpose of characterizing the nature and delineating the extent of contamination at the Site. Samples were maintained under appropriate chain-of-custody control from the time the samples were collected until they were analyzed. Chain-of-custody procedures were used to maintain and document sample possession from collection through analysis. The following documents identified samples and documented possession:

- Sample labels
- Chain-of-Custody record forms
- Field record forms.

The field sampler was responsible for the care and custody of the samples collected until they were delivered to the laboratories under the chain-of-custody procedures. Samples collected for the LEA Analytical Laboratory were maintained under separate chain-of-custody than samples destined for shipment to off-site laboratories. With the proximity of the LEA Analytical Laboratory and the Site, samples collected for analysis at the LEA Analytical Laboratory were transported directly to the analytical laboratory at the end of each sampling day.

### **2.1.4 Sample Storage**

Samples were transported to the LEA Analytical Laboratory at the end of each work day. After transport to the LEA Analytical Laboratory, samples were relinquished to the custody of the laboratory personnel or to a locked, dedicated laboratory refrigerator. At the time the samples were relinquished, the original LEA Chain-of-Custody form was signed over to the receiving party, either the laboratory personnel or the laboratory refrigerator.

As part of the LEA Analytical Laboratory protocols, the temperature of the sample storage refrigerator is maintained at approximately 4°C and a temperature record is maintained as part of the laboratory quality assurance/quality control procedures.

## **2.2 Sample Analyses**

Samples collected during the Site investigation were typically analyzed within 24 to 48 hours after collection. Samples were analyzed using modified EPA Method 3810 - Static Headspace Analysis. This method involved measuring the concentration of target analytes in the headspace over a water or soil-in-water sample and relating that concentration back to the concentration in the original sample.

Soil and groundwater samples were prepared for analysis by first bringing the sample to ambient temperature, then agitating the sample for two minutes by mechanical agitation. After the samples were agitated, they were placed in a constant temperature water bath at approximately 90° F (32°C) for a minimum of 2 minutes.

After the samples had been allowed to equilibrate in the constant temperature water bath, headspace samples for analysis were withdrawn from the vial. The exact volume of headspace withdrawn was analyst-determined and was dependent upon the degree of contamination present, as indicated by the field headspace measurements provided by the field crews, the instrument operating conditions, and the type and condition of the detector lamp installed in the instrument.

This analysis was implemented by gas chromatographic (GC) separation of the contaminants on a Photovac® 10S50 gas chromatograph using a Photovac® CPSil 5 capillary column and a 10.6eV photoionization detector. Analyte identification was by comparison of retention times between standards and unknowns.

Analytical measurements and sample parameters were entered directly into the LEA database to perform the necessary calculations to convert the measured headspace concentrations to soil or groundwater concentrations. The calculation methods correct for the sample weight, injection volume, and sample matrix.

## **2.3 Quality Assurance/Quality Control Procedures**

Quality assurance/quality control (QA/QC) may be grouped into field QA/QC procedures and laboratory QA/QC procedures. Both types of QA/QC are incorporated into the LEA Analytical Laboratory operations protocols.

## 2.3.1 Field Quality Assurance/Quality Control Procedures

Field QA/QC procedures are used to confirm the reliability and validity of the field data gathered during the course of the investigations. Trip blanks are the field QA/QC sample specifically incorporated into the protocol of the LEA Analytical Laboratory. Trip blanks were used to provide a measurement of cross-contamination by VOCs and are incorporated into the LEA Analytical Laboratory protocols. Trip blanks were collected each day for which samples were collected for analysis at the LEA Analytical Laboratory for the presence of VOCs. Trip blanks were analyzed at an approximate rate of one trip blank sample per day. Because in most cases it was possible to store all of the samples collected for the LEA Analytical Laboratory during any given sample day in a single cooler, one trip blank was deemed sufficient.

Additional field QA/QC procedures, including duplicate samples, replicate samples, and equipment blanks are not incorporated into the LEA Analytical Laboratory QA/QC protocols because these samples are not generated by the LEA Analytical Laboratory.

## 2.3.2 Laboratory Analytical Quality Assurance/Quality Control Procedures

Laboratory QA/QC procedures involve the preparation of calibration standards, instrument calibration, analysis of syringe and instrument blanks, surrogate standard spiking, and analysis of laboratory duplicate samples. Laboratory QA/QC procedures were conducted in general accordance with the procedures discussed in the LEA SOP *Standard Operating Procedure for Modified EPA Method 3810 Static Headspace Analysis of Volatile Organic Compounds Using the Photovac® 10S50 Gas Chromatograph*.

Calibration standards were typically prepared by secondary dilution of stock standard solutions purchased directly from laboratory chemical suppliers. Calibration standards were prepared by diluting a known volume of the stock standard solution in a volumetric flask, filling an unused 40 milliliter vial with the calibration solution, and removing 10 milliliters of the solution while simultaneously allowing air to enter the vial. The calibration solution was then treated as a typical sample prior to the analysis, including warming the container in the water bath and agitating the sample for 2 minutes prior to withdrawing a vapor sample for analysis.

Continuing calibration checks were performed daily to ensure that the analytical precision remained within plus or minus twenty percent of the true value. Instrument and syringe blanks were performed at least once per day to ensure the adequacy of the syringe decontamination and the effectiveness of purging on the GC's column. Instrument and syringe blanks were collected and analyzed each day before any samples were analyzed to ensure that the instrument and

syringe(s) were initially clean. Additional instrument and syringe blanks were collected at the discretion of the analyst to verify that the instrument and syringe(s) were free of contaminants.

Laboratory duplicate samples were analyzed to assess analytical precision. Precision is a measurement of the agreement of replicate measurements without reference to a known or assumed value. Laboratory duplicate analyses were performed once per twenty field samples per sample matrix, or once per sample set, whichever was greater.

### **2.3.3 Method Detection Limits**

Method detection limit (MDL) studies have been conducted for the LEA Analytical Laboratory on an approximately annual basis since 1994, prior to beginning the Airport/Klondike Area investigations. The MDL was defined as the concentration of a particular compound which could be consistently quantified within the limits of the required precision and accuracy. MDL studies have been conducted according to the procedures specified in Title 40 of the Code of Federal Regulations Part 136 (40 CFR 136) Appendix B. The target compound MDLs have been established at 5 micrograms per liter ( $\mu\text{g/L}$ ) for all compounds except TCA for which the MDL was established as 65  $\mu\text{g/L}$ . A summary of the MDL study results for the compounds analyzed by the LEA Analytical Laboratory for the Airport/Klondike Area Project is presented in Table 1.

### **2.3.4 Sensitivity**

Sensitivity was the measure of the limits on analytical detection and quantitation. Sensitivity referred to the minimum amount of each analyte that could be detected and reported with a high degree of confidence and to the minimum concentration that could be reported quantitatively within the precision and accuracy requirements of the analytical standard operating procedure. Sensitivity could be affected by contamination and the performance of the instruments. The MDL was the minimum concentration of an analyte that could be identified, measured, and reported with a 99 percent confidence level that the analyte concentration was greater than zero. The MDL was the amount that could be consistently quantified within the requirements for precision and accuracy.

### **2.3.5 Calibration**

Initial calibrations were performed with five-point standard calibration curves covering the range of approximately 5  $\mu\text{g/L}$  to 100  $\mu\text{g/L}$ . Continuing calibration checks were performed once per day to determine if the initial calibration was still applicable. Continuing calibration check

samples consisted of the analysis of a parameter which represented, at a minimum, an intermediate concentration and retention time. PCE was the most frequently used parameter.

## 2.3.6 Surrogate Standards

Surrogate standards are compounds, not included in the target compound list, which are added to a sample at known concentrations and for which an analysis is conducted. The purpose of the added surrogate compounds is to provide a measure of the ability of the analytical procedure to recover contaminants from the specific sample matrix. Surrogate compounds are selected to be as chemically similar to the target compounds as possible, while remaining easily identifiable by the analytical procedure. The LEA Analytical Laboratory uses a solution of monochlorobenzene in methanol as a surrogate for groundwater and soil samples.

The criteria established for acceptable surrogate recovery was between 80 and 120 percent of the material introduced into the sample. Recoveries greater than 120 percent were indicators of mechanical problems with the GC, inaccurate sample volumes, or the presence of monochlorobenzene in the sample. Sample recoveries less than 80 percent were indicators of mechanical problems with the GC, inaccurate sample volumes, or matrix interference effects.

In the case of sample recoveries less than 70 percent, the standard operating procedures called for an additional aliquot of the soil sample to be re-extracted using methanol to enhance sample recovery and reanalyzed. Sample results from methanol extractions were flagged with an "M" to indicate the use of methanol. However, no samples were extracted with methanol for the Airport/Klondike Area Project.

## 2.4 Decontamination of Materials and Equipment

The purpose of consistent decontamination procedures is to prevent the potential spread of contamination between samples and laboratory equipment and from the immediate work area in the laboratory. Sampling equipment decontamination is discussed in more detail in *TM 1 Monitoring Well Installation and Development and Soil Sampling* and *TM 5 Soil Boring Installation and Soil Sampling*.

Laboratory equipment used in sample analyses included syringes, water baths, glassware dedicated to standard preparation, gas chromatograph, and sample agitators. In general, water baths and sample agitators do not come in contact with samples and, therefore, are not decontaminated.

Laboratory glassware was decontaminated using the following procedure:

- Fill sink with tap water. Add Alconox<sup>®</sup> laboratory detergent.
- Wash glassware thoroughly in soap and water.
- Soak glassware overnight in soap and water in the sink.
- In the morning, rinse glassware thoroughly with tap water.
- Rinse glassware three times with 10 percent hydrochloric acid solution.
- Rinse glassware three times with distilled water.
- Rinse glassware three times with methanol.
- Place glassware in 80° C oven for one hour.

Laboratory syringes were decontaminated using three specially prepared methanol rinse solutions using the following procedure:

- Remove the metal plunger and gently wipe with a cleaning tissue.
- Flush the re-assembled syringe with methanol from Methanol Rinse #1.
- Remove the metal plunger and gently wipe with a cleaning tissue.
- Flush the re-assembled syringe with methanol from Methanol Rinse #2.
- Remove the metal plunger and gently wipe with a cleaning tissue.
- Flush the re-assembled syringe with methanol from Methanol Rinse #3.
- Air dry the syringe, or oven dry the disassembled syringe in a 50° C, or less, oven.

The GC column was not directly decontaminated. During the normal operation of the GC, the contaminants injected from a sample are eventually flushed through the column through the combined effects of the column temperature and the carrier gas. The analytical method in use was designed to extract only the volatile compounds from the samples, because the heavier semivolatile compounds would not effectively vaporize under the sample preparation conditions used. Therefore the column could be effectively flushed through relatively short purge times.

## **2.5 Sample Custody**

LEA Analytical Laboratory personnel carried out various procedures for documenting sample custody. Sample custody was documented on the LEA Internal Chain of Custody forms which accompanied each sample group. The following procedures were used to provide accurate documentation of custody:

- The sample shipments were checked against the accompanying chain-of-custody forms. If discrepancies were noted, the field activities coordinator and/or the project manager was contacted and issues were resolved appropriately. One copy of the chain-of-custody form was retained by the laboratory.
- The sample containers were inspected for conditions that would compromise the integrity of the sample. The majority of the samples were received in good condition. Occasionally 40 milliliter vials were received with less than 30 milliliters of soil and water, creating too much headspace. The contents of the sample with an inadequate volume were analyzed as a normal soil sample. However, the non-conforming conditions were noted on the laboratory report generated for the sample. Because these samples were used as screening data, some amount of latitude was allowed in the volume of sample required before the data were rejected. Typically, a volume of 30 milliliters plus or minus 2.5 milliliters was considered acceptable. Results from samples with too much headspace were flagged “R2” to indicate that these data were rejected due to non-conforming sample collection procedures.
- The samples were assigned laboratory identification numbers. The identification numbers were used on work and data sheets, instrument-output reports, and sample results reports. Tracking was sufficiently documented to permit reconstruction of the data trail.
- The security of samples and standards was maintained by storing the samples in the laboratory’s sample refrigerator and by locking the room when the laboratory was not occupied.

After the final laboratory report was generated, all documents relating to sample custody were archived.

## 2.6 Reporting

The laboratory manager reviewed the analytical data before sample results were released. Analytical results that were lower than the MDL and were not detected were flagged as not detected at the MDL, for example, a soil sample with no detectable concentration of PCE was reported as “ND<5.” Analytical results that were lower than the MDL, but were detected, were flagged with a “J” to indicate that these values were estimated. Analytical results that were

above the MDL and met the QA/QC criteria established by the LEA Analytical Laboratory were reported without qualifiers. Analytical results that were outside the calibration range were flagged with an “E” to indicate that these values were estimated.

Analytical results which were rejected were qualified with one of the “R” qualifiers. Results that could not be qualified due to co-elution of numerous unidentified peaks were flagged with an “R1,” indicating that the data were rejected. Analytical data from samples with an improper amount of headspace or with otherwise non-conforming characteristics were flagged with an “R2” qualifier. Results which were unusable due to laboratory errors were flagged with an “R3” qualifier. Other data qualifiers, including those indicating methanol extractions, are presented in Table 2.

After the analyses were performed, the laboratory reports were generated in both hard copy and electronic formats. Analytical results were electronically transferred to the sample database of all analytical data. Incremental computer backups were performed daily, and a full system backup was performed weekly. A complete set of electronic data was archived in a separate location from the paper copy laboratory reports to further protect against loss.

The raw data were retained by the laboratory, in the possession of the analyst, for the duration of the field investigation. Copies of the draft daily summaries of analytical results were made available to the field activities coordinator and the project manager for review.

## **2.7 Waste Management**

In general, laboratory wastes generated by the LEA Analytical Laboratory consist of the spent samples, waste standards, and miscellaneous waste laboratory products. Waste standard solutions and the miscellaneous wastes were disposed of by the LEA Analytical Laboratory in on-site storage containers and periodically disposed of through outside vendors.

Waste samples were stored under proper custody procedures until the analytical results were verified, and then were relinquished to a storage area. Periodically, waste samples were returned to P&W and drummed in accordance with proper waste management procedures into P&W-supplied drums. Waste samples were disposed of by P&W as appropriate.



### 3. RESULTS

For the Airport/Klondike Area Project, approximately 5,128 soil samples and 12 groundwater samples were analyzed by the LEA Analytical Laboratory. The majority of these samples were analyzed within 24 to 48 hours after collection. None of these samples were extracted with methanol. Analytical results for these samples are presented in the appropriate Unit Specific Technical Memoranda (USTMs).

For the investigation activities, the results of these soil analyses were used, in conjunction with other relevant data, including visual, olfactory, or instrument evidence (i.e., photoionization detector, flame ionization detector), and with consideration of the potential release mechanism, to select soil samples for submission to fixed off-site laboratories for additional analytical testing.

# DRAFT

## TABLES

# DRAFT

**Table 1**  
**LEA Analytical Laboratory Method Detection Limit Study Results**  
**Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

<b>Compound</b>	<b>Units</b>	<b>10/18/94<sup>a</sup></b>	<b>5/11/95</b>	<b>3/5/96</b>	<b>6/1/98<sup>b</sup></b>
Benzene	µg/L	Not Performed	5	5	1 / 2
Toluene	µg/L	Not Performed	5	5	2 / 2
Ethylbenzene	µg/L	Not Performed	5	5	2 / 2
Total Xylenes	µg/L	Not Performed	5	5	Not Performed
m- and p- Xylene	µg/L	Not Performed	Not Performed	Not Performed	1 / 3
o-Xylene	µg/L	Not Performed	Not Performed	Not Performed	2 / 2
Chlorobenzene	µg/L	Not Performed	Not Performed	Not Performed	1 / 2
Tetrachloroethylene	µg/L	4	5	5	1 / 2
1,1,1-Trichloroethane	µg/L	11	65	65	20 / 20
Trichloroethylene	µg/L	3	5	5	2 / 2

<sup>a</sup> Note the detector for this period was an 11.7eV lamp.

<sup>b</sup> Reported values are for instrument gains of 20 and 10, respectively.

**Table 2**  
**LEA Analytical Laboratory Data Qualifiers**  
**Airport/Klondike Area, Pratt & Whitney, East Hartford, Connecticut**

<b>Qualifier</b>	<b>Explanation</b>
<b>ND</b>	Non detected; less than default detection limit.
<b>NA</b>	Compound not analyzed.
<b>J</b>	Estimated value. Compound present at a concentration below the method detection limit.
<b>E</b>	Estimated value. Concentration outside calibration range.
<b>*</b>	Daily control sample outside acceptable limits ( $\pm 20\%$ ).
<b>R</b>	Reject data.
<b>R1</b>	Reject data. Compound may or may not be present. Determination cannot be made due to the presence of numerous unidentifiable peaks.
<b>R2</b>	Reject data. Sample does not conform with standard sample collection protocol.
<b>R3</b>	Reject data. Laboratory error.
<b>U</b>	None-detected; qualified due to the presence of compound in the blank.
<b>B</b>	Compound detected in blank.
<b>M</b>	Soil sample extracted with methanol.
<b>I</b>	Interference due to coelution of peaks.
<b>Q</b>	Data to be used qualitatively only.